

What is claimed is:

- 1 1. A high voltage device comprising:
2 a substrate of a first type;
3 a first and second well respectively of the first and a
4 second type in the substrate;
5 a gate formed on the substrate;
6 a first and second doped region both of the second
7 type, respectively formed in the first and second
8 well and both sides of the gate; and
9 a third doped region of the first type in the first
10 well and adjacent to the first doped region.
- 1 2. The high voltage device as claimed in claim 1
2 further comprising field oxides isolating the high voltage
3 device from other devices on the substrate.
- 1 3. The high voltage device as claimed in claim 1,
2 wherein the gate comprises a gate oxide on the substrate, a
3 conducting layer on the gate oxide and spacers on two sides
4 of the gate oxide and conducting layer.
- 1 4. The high voltage device as claimed in claim 3
2 further comprising a fourth lightly doped region of the
3 second type adjacent to the first doped region and beneath
4 one of the spacers.
- 1 5. The high voltage device as claimed in claim 1,
2 wherein there is a spacing of the second doped region to the
3 gate.

1 6. The high voltage device as claimed in claim 1,
2 wherein the overlay of the gate and the second well is
3 defined as zero.

1 7. The high voltage device as claimed in claim 1,
2 wherein the first and second types are respectively P and N
3 type.

1 8. The high voltage device as claimed in claim 1,
2 wherein the first and second type are respectively N and P
3 type and the high voltage device further comprises a N+
4 buried layer in the substrate and beneath the first and
5 second well.

1 9. A high voltage device formed on a P substrate
2 comprising:

3 an HVNMOS comprising:
4 a first P and N well in the P substrate;
5 a first gate formed on the P substrate;
6 two first N+ doped regions respectively formed in
7 the first P and N well, and both sides of
8 the first gate; and
9 a first P+ doped region in the first P well and
10 adjacent to the first N+ doped region in the
11 first P well; and

12 a HVP MOS comprising:
13 an N+ buried layer in the P substrate;
14 a second N and P well in the P substrate and above
15 the N+ buried layer;
16 a second gate formed on the P substrate;

17 two second P+ doped regions respectively formed in
18 the second N and P well, and both sides of
19 the second gate; and
20 a second N+ doped region in the second N well and
21 adjacent to the second P+ doped region in
22 the second N well.

1 10. The high voltage device as claimed in claim 9
2 further comprising field oxides isolating the HVPMOS and
3 HVNOMS from other devices on the P substrate.

1 11. The high voltage device as claimed in claim 9,
2 wherein each of the first and second gates comprise a gate
3 oxide on the P substrate, a conducting layer on the gate
4 oxide and spacers on both sides of the gate oxide and
5 conducting layer.

1 12. The high voltage device as claimed in claim 11,
2 wherein the HVNMOS further comprises an N lightly doped
3 region adjacent to the first N doped region in the first P
4 well and beneath one of the spacers of the first gate, and
5 the HVPMOS further comprises a P lightly doped region
6 adjacent to the second P doped region in the second N well
7 and beneath one of the spacers of the second gate.

1 13. The high voltage device as claimed in claim 9,
2 wherein there is spacing of the first N+ doped region in the
3 first N well to the first gate and the second P+ doped
4 region in the second P well to the second gate.

1 14. The high voltage device as claimed in claim 9,
2 wherein the overlay of the first gate and the first P well,

3 and the second gate and the second N well are defined as
4 zero.

1 15. A method for manufacturing a high voltage device,
2 comprising the steps of:

3 providing a substrate of a first type;
4 forming a first and second well respectively of the
5 first and a second type in the substrate;
6 forming a gate on the substrate;
7 forming a first and second doped region both of the
8 second type, respectively in the first and second
9 well and both sides of the gate; and
10 forming a third doped region of the first type in the
11 first well and adjacent to the first doped
12 region.

1 16. The method as claimed in claim 15 further
2 comprising the step of:

3 forming field oxides isolating the high voltage device
4 from other devices on the substrate.

1 17. The method as claimed in claim 15, wherein the
2 gate comprises a gate oxide on the substrate, a conducting
3 layer on the gate oxide and spacers on two sides of the gate
4 oxide and conducting layer.

1 18. The method as claimed in claim 17 further
2 comprising the step of:

3 forming a fourth lightly doped region of the second
4 type adjacent to the first doped region and
5 beneath one of the spacers.

1 19. The method as claimed in claim 15, wherein there
2 is a spacing of the second doped region to the gate.

1 20. The method as claimed in claim 15, wherein the
2 overlay of the gate and the second well is defined as zero.

1 21. The method as claimed in claim 15, wherein the
2 first and second type are respectively P and N type.

1 22. The method as claimed in claim 1, wherein the
2 first and second type are respectively N and P type and the
3 method further comprises the step of:

4 forming an N+ buried layer in the substrate and beneath
5 the first and second well.

1 23. A method for manufacturing a high voltage device
2 comprising the steps of:

3 providing a P substrate;

4 forming a HVNMOS on the P substrate by:

5 forming a first P and N well in the P substrate;

6 forming a first gate on the P substrate;

7 forming two first N+ doped regions respectively in
8 the first P and N well, and both sides of
9 the first gate; and

10 forming a first P+ doped region in the first P
11 well and adjacent to the first N+ doped
12 region in the first P well; and

13 forming a HVPMOS on the P substrate by:

14 forming an N+ buried layer in the P substrate;

15 forming a second N and P well in the P substrate
16 and above the N+ buried layer;

17 forming a second gate on the P substrate;
18 forming two second P+ doped regions respectively
19 in the second N and P well, and both sides
20 of the second gate; and
21 forming a second N+ doped region in the second N
22 well and adjacent to the second P+ doped
23 region in the second N well.

1 24. The method as claimed in claim 23 further
2 comprising the step of:
3 forming field oxides isolating the HVPMOS and HVNMOS
4 from other devices on the P substrate.

1 25. The method as claimed in claim 23, wherein each of
2 the first and second gate comprises a gate oxide on the P
3 substrate, a conducting layer on the gate oxide and spacers
4 on both sides of the gate oxide and conducting layer.

1 26. The method as claimed in claim 25 further
2 comprising the steps of:
3 forming a N lightly doped region adjacent to the first
4 N doped region in the first P well and beneath
5 one of the spacers of the first gate; and
6 forming a P lightly doped region adjacent to the second
7 P doped region in the second N well and beneath
8 one of the spacers of the second gate.

1 27. The method as claimed in claim 23, wherein there
2 is spacing of the first N+ doped region in the first N well
3 to the first gate and the second P+ doped region in the
4 second P well to the second gate.

1 28. The method as claimed in claim 23, wherein the
2 overlay of the first gate and the first P well, and the
3 second gate and the second N well are defined as zero.